

Review of the 2006 Summer Flounder Assessment Update
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A review of the 2006 Summer Flounder assessment update was conducted on September 14-15 in Woods Hole, MA. The reviewers were tasked with (1) reviewing the draft document “Summer Flounder Biological Reference Point Update for 2006” (BRP update) by Mark Terceiro, (2) addressing the following three questions:

- a. Is an appropriate historical time period being used to provide biological inputs for the projections?
- b. Has an appropriate adjustment been made for the assessment model’s documented retrospective bias?
- c. Is the rebuilding target and rate based upon an accurate estimate of the recruitment levels expected as the stock rebuilds?

and (3) providing comments and recommendations regarding possible future improvements in the assessment.

Findings:

(1) The BRP update contained a thorough overview of recent and past assessment modeling and reviews. The panel agreed with the use of the “non-parametric” method for reference point estimation given the relatively short time series of recruitment and the lack of contrast in spawning biomass. Continued monitoring of recruitment as the stock rebuilds should provide more information which may eventually allow for parametric spawner-recruit curve estimation. The main changes suggested to the BRP update in this review were:

- i. Use the SSB instead of the TSB for reference points, as this better represents reproductive potential.
- ii. Use the mean (rather than median) recruitment for 1982-2005 for reference point estimation.
- iii. Use the long-term (1992-2005) mean weight-at-age for reference point estimation and long-term (2011+) projections, but continue to use the short-term (2003-2005) mean weight-at-age for shorter term projections (through 2010) and the setting of the 2007 TAL. The long-term means better represent what is expected on average, whereas the short-term means better represent the likely near-term weights.
- iv. The review found that the treatment of zeroes in survey indices in the summer flounder assessment model was problematic. These were previously treated as missing data as the log-normal error function cannot deal with zeroes. However, this means throwing out the lowest indices which results in bias and likely leads to underestimation of the magnitude of change (i.e. the true trend). In order to include these zeroes, they were replaced with a value that is one-sixth of the lowest positive value observed for each index.

(2) Specific questions to be addressed:

- a. The following historical time periods were found to be appropriate for the assessment and rebuilding analysis and setting of TALs: 1982-2005 for recruitment, 1992-2005 for maturity at age and long-term weight-at-age, and 2003-2005 for partial recruitment and short-term weight-at-age. For long-term projections and reference point estimation these are the full time series of data, except in the case of partial recruitments due to recent changes in management which have reduced the relative catch of the youngest age groups. For the short-term projections, the short-term average weight at age is used to better reflect current conditions.
- b. Although there are many possible factors which might be contributing to the retrospective pattern, it is not clear which of these are responsible and to what degree, so more work must be done before the retrospective issue can be completely and correctly addressed. These possibilities are enumerated in the "Future Research" section of this report. It appears that the retrospective bias has diminished in the last year, and in the 1990s there was a retrospective problem in the opposite direction. Therefore it is difficult to discern the appropriate retrospective adjustment from year to year, though the possibility of continuing retrospective bias suggests a precautionary stance.
- c. The assessment uses the estimated recruitment levels from 1982 to 2005 which provide the best estimate of mean and variability in recruitment. No evidence of fundamental changes in the population parameters was noted, and the time series of recruitment is relatively short and contains little contrast in spawning stock size. While the largest recruitments were seen in the first two years of this time series, there is no reason to believe that such recruitments shouldn't occur again, especially as the stock rebuilds. The 2005 recruitment estimate is close to that for 1988, and therefore does not suggest a change in the recruitment pattern.

(3) Areas of future improvement/research:

There are a number of areas where additional complexity or improvement in the model or data could be made after further inquiry or research:

- i. Sex-specific growth and natural mortality.
- ii. Early age-specific mortality.
- iii. Discard mortality, especially for recreational fishery.
- iv. Differences in partial recruitment patterns in commercial vs. recreational fisheries, as well as divisions within these fisheries.
- v. Accuracy of landings estimates.
- vi. Statistical methods for treatment of zeroes in the surveys.
- vii. Weighting and/or combining of surveys.
- viii. Alternative assessment models to compare to the VPA and allow for more extensive exploration of model and data formulations.